

SEQUENCE LISTING

<110> Steward, Lance E.
Fernandez-Salas, Ester
Aoki, Kei Roger

<120> Fret Protease Assays For Clostridial
Toxins

<130> P-AR 4802

<160> 96

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 8

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic construct

<400> 1

Glu Ala Asn Gln Arg Ala Thr Lys
1 5

<210> 2

<211> 206

<212> PRT

<213> Homo sapiens

<400> 2

Met	Ala	Glu	Asp	Ala	Asp	Met	Arg	Asn	Glu	Leu	Glu	Glu	Met	Gln	Arg
1				5				10						15	
Arg	Ala	Asp	Gln	Leu	Ala	Asp	Glu	Ser	Leu	Glu	Ser	Thr	Arg	Arg	Met
		20					25						30		
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val
		35					40					45			
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Glu	Arg	Ile	Glu	Glu	Gly	Met
	50					55					60				
Asp	Gln	Ile	Asn	Lys	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Thr	Asp
65				70					75					80	
Leu	Gly	Lys	Phe	Cys	Gly	Leu	Cys	Val	Cys	Pro	Cys	Asn	Lys	Leu	Lys
			85						90					95	
Ser	Ser	Asp	Ala	Tyr	Lys	Lys	Ala	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val
		100					105					110			
Val	Ala	Ser	Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala
		115					120					125			

F08220"8602450

```
<210> 3
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct
```

```
<210> 4
<211> 116
<212> PRT
<213> Homo sapiens
```

$\langle 210 \rangle$	5
$\langle 211 \rangle$	8

<400> 7																
Met	Ala	Glu	Asp	Ala	Asp	Met	Arg	Asn	Glu	Leu	Glu	Glu	Met	Gln	Arg	
1				5					10					15		
Arg	Ala	Asp	Gln	Leu	Ala	Asp	Glu	Ser	Leu	Glu	Ser	Thr	Arg	Arg	Met	
			20					25					30			
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val	
		35					40					45				
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Glu	Arg	Ile	Glu	Glu	Gly	Met	
	50					55					60					
Asp	Gln	Ile	Asn	Lys	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Thr	Asp	
65				70						75					80	
Leu	Gly	Lys	Phe	Cys	Gly	Leu	Cys	Val	Cys	Pro	Cys	Asn	Lys	Leu	Lys	
				85					90					95		
Ser	Ser	Asp	Ala	Tyr	Lys	Lys	Ala	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val	
			100					105					110			
Val	Ala	Ser	Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala	
		115					120					125				
Ile	Ser	Gly	Gly	Phe	Ile	Arg	Arg	Val	Thr	Asn	Asp	Ala	Arg	Glu	Asn	
	130					135					140					
Glu	Met	Asp	Glu	Asn	Leu	Glu	Gln	Val	Ser	Gly	Ile	Ile	Gly	Asn	Leu	

145					150					155					160
Arg	His	Met	Ala	Leu	Asp	Met	Gly	Asn	Glu	Ile	Asp	Thr	Gln	Asn	Arg
				165						170				175	
Gln	Ile	Asp	Arg	Ile	Met	Glu	Lys	Ala	Asp	Ser	Asn	Lys	Thr	Arg	Ile
			180					185					190		
Asp	Glu	Ala	Asn	Gln	Arg	Ala	Thr	Lys	Met	Leu	Gly	Ser	Gly		
		195					200					205			

<210> 8
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<400> 8
Gln Ile Asp Arg Ile Met Glu Lys
1 5

<210> 9
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<400> 9
Glu Arg Asp Gln Lys Leu Ser Glu
1 5

<210> 10
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<400> 10
Glu Thr Ser Ala Ala Lys Leu Lys
1 5

FEEDBACK 360450

<210> 11
 <211> 8
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthetic construct

<400> 11
 Gly Ala Ser Gln Phe Glu Thr Ser
 1 5

<210> 12
 <211> 206
 <212> PRT
 <213> Mus musculus

<400> 12
 Met Ala Glu Asp Ala Asp Met Arg Asn Glu Leu Glu Glu Met Gln Arg
 1 5 10 15
 Arg Ala Asp Gln Leu Ala Asp Glu Ser Leu Glu Ser Thr Arg Arg Met
 20 25 30
 Leu Gln Leu Val Glu Glu Ser Lys Asp Ala Gly Ile Arg Thr Leu Val
 35 40 45
 Met Leu Asp Glu Gln Gly Glu Gln Leu Glu Arg Ile Glu Glu Gly Met
 50 55 60
 Asp Gln Ile Asn Lys Asp Met Lys Glu Ala Glu Lys Asn Leu Thr Asp
 65 70 75 80
 Leu Gly Lys Phe Cys Gly Leu Cys Val Cys Pro Cys Asn Lys Leu Lys
 85 90 95
 Ser Ser Asp Ala Tyr Lys Lys Ala Trp Gly Asn Asn Gln Asp Gly Val
 100 105 110
 Val Ala Ser Gln Pro Ala Arg Val Val Asp Glu Arg Glu Gln Met Ala
 115 120 125
 Ile Ser Gly Gly Phe Ile Arg Arg Val Thr Asn Asp Ala Arg Glu Asn
 130 135 140
 Glu Met Asp Glu Asn Leu Glu Gln Val Ser Gly Ile Ile Gly Asn Leu
 145 150 155 160
 Arg His Met Ala Leu Asp Met Gly Asn Glu Ile Asp Thr Gln Asn Arg
 165 170 175
 Gln Ile Asp Arg Ile Met Glu Lys Ala Asp Ser Asn Lys Thr Arg Ile
 180 185 190
 Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly Ser Gly
 195 200 205

<210> 13
 <211> 212
 <212> PRT
 <213> Drosophila sp.

T08230" 86024650

<400> 13

Met	Pro	Ala	Asp	Pro	Ser	Glu	Glu	Val	Ala	Pro	Gln	Val	Pro	Lys	Thr
1				5					10					15	
Glu	Leu	Glu	Glu	Leu	Gln	Ile	Asn	Ala	Gln	Gly	Val	Ala	Asp	Glu	Ser
			20					25					30		
Leu	Glu	Ser	Thr	Arg	Arg	Met	Leu	Ala	Leu	Cys	Glu	Glu	Ser	Lys	Glu
		35					40					45			
Ala	Gly	Ile	Arg	Thr	Leu	Val	Ala	Leu	Asp	Asp	Gln	Gly	Glu	Gln	Leu
	50					55					60				
Asp	Arg	Ile	Glu	Glu	Gly	Met	Asp	Gln	Ile	Asn	Ala	Asp	Met	Arg	Glu
65					70				75					80	
Ala	Glu	Lys	Asn	Leu	Ser	Gly	Met	Glu	Lys	Cys	Cys	Gly	Ile	Cys	Val
			85						90					95	
Leu	Pro	Cys	Asn	Lys	Ser	Gln	Ser	Phe	Lys	Glu	Asp	Asp	Gly	Thr	Trp
			100					105					110		
Lys	Gly	Asn	Asp	Asp	Gly	Lys	Val	Val	Asn	Asn	Gln	Pro	Gln	Arg	Val
		115					120					125			
Met	Asp	Asp	Arg	Asn	Gly	Met	Met	Ala	Gln	Ala	Gly	Tyr	Ile	Gly	Arg
	130					135						140			
Ile	Thr	Asn	Asp	Ala	Arg	Glu	Asp	Glu	Met	Glu	Glu	Asn	Met	Gly	Gln
145					150					155					160
Val	Asn	Thr	Met	Ile	Gly	Asn	Leu	Arg	Asn	Met	Ala	Leu	Asp	Met	Gly
				165					170					175	
Ser	Glu	Leu	Glu	Asn	Gln	Asn	Arg	Gln	Ile	Asp	Arg	Ile	Asn	Arg	Lys
			180					185					190		
Gly	Glu	Ser	Asn	Glu	Ala	Arg	Ile	Ala	Val	Ala	Asn	Gln	Arg	Ala	His
		195					200					205			
Gln	Leu	Leu	Lys												
		210													

<210> 14

<211> 203

<212> PRT

<213> Carassius auratus

<400> 14

Met	Ala	Asp	Glu	Ala	Asp	Met	Arg	Asn	Glu	Leu	Thr	Asp	Met	Gln	Ala
1				5					10					15	
Arg	Ala	Asp	Gln	Leu	Gly	Asp	Glu	Ser	Leu	Glu	Ser	Thr	Arg	Arg	Met
			20					25					30		
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val
		35					40					45			
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Glu	Arg	Ile	Glu	Glu	Gly	Met
	50					55					60				
Asp	Gln	Ile	Asn	Lys	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Thr	Asp
65				70					75					80	
Leu	Gly	Asn	Leu	Cys	Gly	Leu	Cys	Pro	Cys	Pro	Cys	Asn	Lys	Leu	Lys
			85					90						95	
Gly	Gly	Gly	Gln	Ser	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val	Val	Ser	Ser
			100					105					110		
Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala	Ile	Ser	Gly
		115					120					125			

TC2220-032450

```
<210> 15
<211> 212
<212> PRT
<213> Strongylocentrotus purpuratus
```

```
<210> 16
<211> 249
<212> PRT
<213> Gallus gallus
```

<400> 16

Met	Ala	Glu	Asp	Ala	Asp	Met	Arg	Asn	Glu	Leu	Glu	Glu	Met	Gln	Arg
1				5					10					15	
Arg	Ala	Asp	Gln	Leu	Ala	Asp	Glu	Ser	Leu	Glu	Ser	Thr	Arg	Arg	Met
		20						25					30		
Leu	Gln	Leu	Val	Glu	Glu	Ser	Lys	Asp	Ala	Gly	Ile	Arg	Thr	Leu	Val
		35					40					45			
Met	Leu	Asp	Glu	Gln	Gly	Glu	Gln	Leu	Asp	Arg	Val	Glu	Glu	Gly	Met
	50					55					60				
Asn	His	Ile	Asn	Gln	Asp	Met	Lys	Glu	Ala	Glu	Lys	Asn	Leu	Lys	Asp
65					70					75					80
Leu	Gly	Lys	Cys	Cys	Gly	Leu	Phe	Ile	Cys	Pro	Cys	Asn	Lys	Leu	Lys
			85						90					95	
Ser	Ser	Asp	Ala	Tyr	Lys	Lys	Ala	Trp	Gly	Asn	Asn	Gln	Asp	Gly	Val
			100					105					110		
Val	Ala	Ser	Gln	Pro	Ala	Arg	Val	Val	Asp	Glu	Arg	Glu	Gln	Met	Ala
		115					120					125			
Ile	Ser	Gly	Gly	Phe	Ile	Arg	Arg	Val	Thr	Asn	Asp	Ala	Arg	Glu	Asn
	130					135					140				
Glu	Met	Asp	Glu	Asn	Leu	Glu	Gln	Val	Ser	Gly	Ile	Ile	Gly	Asn	Leu
145					150					155					160
Arg	His	Met	Ala	Leu	Asp	Met	Gly	Asn	Glu	Ile	Asp	Thr	Gln	Asn	Arg
			165					170						175	
Gln	Ile	Asp	Arg	Ile	Met	Glu	Lys	Leu	Ile	Pro	Ile	Lys	Pro	Gly	Leu
		180						185					190		
Met	Lys	Pro	Thr	Ser	Val	Gln	Gln	Arg	Cys	Ser	Ala	Val	Val	Lys	Cys
	195						200					205			
Ser	Lys	Val	His	Phe	Leu	Leu	Met	Leu	Ser	Gln	Arg	Ala	Val	Pro	Ser
	210					215					220				
Cys	Phe	Tyr	His	Gly	Ile	Tyr	Leu	Leu	Gly	Leu	His	Thr	Cys	Thr	Tyr
225					230					235					240
Gln	Pro	His	Cys	Lys	Cys	Cys	Pro	Val							
				245											

<210> 17

<211> 116

<212> PRT

<213> Mus musculus

<400> 17

Met	Ser	Ala	Thr	Ala	Ala	Thr	Val	Pro	Pro	Ala	Ala	Pro	Ala	Gly	Glu
1				5					10					15	
Gly	Gly	Pro	Pro	Ala	Pro	Pro	Pro	Asn	Leu	Thr	Ser	Asn	Arg	Arg	Leu
		20						25					30		
Gln	Gln	Thr	Gln	Ala	Gln	Val	Asp	Glu	Val	Val	Asp	Ile	Met	Arg	Val
		35					40					45			
Asn	Val	Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp
	50					55					60				
Asp	Arg	Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Gln	Phe	Glu	Thr	Ser
65					70					75					80
Ala	Ala	Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp	Lys	Asn	Leu	Lys	Met	Met
				85					90					95	

FO3230"26024650


```
<210> 18
<211> 116
<212> PRT
<213> Bos taurus
```

```
<210> 19
<211> 114
<212> PRT
<213> Xenopus laevis
```

[illegible]

<400>	21															
Met	Lys	Asp	Arg	Thr	Gln	Glu	Leu	Arg	Thr	Ala	Lys	Asp	Ser	Asp	Asp	
1				5					10					15		
Asp	Asp	Asp	Val	Ala	Val	Thr	Val	Asp	Arg	Asp	Arg	Phe	Met	Asp	Glu	
			20					25					30			
Phe	Phe	Glu	Gln	Val	Glu	Glu	Ile	Arg	Gly	Phe	Ile	Asp	Lys	Ile	Ala	
		35					40					45				
Glu	Asn	Val	Glu	Glu	Val	Lys	Arg	Lys	His	Ser	Ala	Ile	Leu	Ala	Ser	
	50					55				60						
Pro	Asn	Pro	Asp	Glu	Lys	Thr	Lys	Glu	Glu	Leu	Glu	Glu	Leu	Met	Ser	
65					70					75					80	
Asp	Ile	Lys	Lys	Thr	Ala	Asn	Lys	Val	Arg	Ser	Lys	Leu	Lys	Ser	Ile	
				85					90					95		
Glu	Gln	Ser	Ile	Glu	Gln	Glu	Glu	Gly	Leu	Asn	Arg	Ser	Ser	Ala	Asp	
			100					105					110			
Leu	Arg	Ile	Arg	Lys	Thr	Gln	His	Ser	Thr	Leu	Ser	Arg	Lys	Phe	Val	
		115				120						125				
Glu	Val	Met	Ser	Glu	Tyr	Asn	Ala	Thr	Gln	Ser	Asp	Tyr	Arg	Glu	Arg	
	130					135				140						
Cys	Lys	Gly	Arg	Ile	Gln	Arg	Gln	Leu	Glu	Ile	Thr	Gly	Arg	Thr	Thr	
145				150						155					160	
Thr	Ser	Glu	Glu	Leu	Glu	Asp	Met	Leu	Glu	Ser	Gly	Asn	Pro	Ala	Ile	
				165					170					175		
Phe	Ala	Ser	Gly	Ile	Ile	Met	Asp	Ser	Ser	Ile	Ser	Lys	Gln	Ala	Leu	
			180					185					190			

Ser	Glu	Ile	Glu	Thr	Arg	His	Ser	Glu	Ile	Ile	Lys	Leu	Glu	Asn	Ser
	195						200					205			
Ile	Arg	Glu	Leu	His	Asp	Met	Phe	Met	Asp	Met	Ala	Met	Leu	Val	Glu
	210					215					220				
Ser	Gln	Gly	Glu	Met	Ile	Asp	Arg	Ile	Glu	Tyr	Asn	Val	Glu	His	Ala
	225				230					235					240
Val	Asp	Tyr	Val	Glu	Arg	Ala	Val	Ser	Asp	Thr	Lys	Lys	Ala	Val	Lys
			245						250					255	
Tyr	Gln	Ser	Lys	Ala	Arg	Arg	Lys	Lys	Ile	Met	Ile	Ile	Ile	Cys	Cys
		260						265					270		
Val	Ile	Leu	Gly	Ile	Val	Ile	Ala	Ser	Thr	Val	Gly	Gly	Ile	Phe	Ala
	275						280					285			

<210> 22

<211> 288

<212> PRT

<213> Homo sapiens

<400> 22

Met	Lys	Asp	Arg	Thr	Gln	Glu	Leu	Arg	Ser	Ala	Lys	Asp	Ser	Asp	Asp
1				5					10					15	
Glu	Glu	Glu	Val	Val	His	Val	Asp	Arg	Asp	His	Phe	Met	Asp	Glu	Phe
			20					25					30		
Phe	Glu	Gln	Val	Glu	Glu	Ile	Arg	Gly	Cys	Ile	Glu	Lys	Leu	Ser	Glu
		35					40					45			
Asp	Val	Glu	Gln	Val	Lys	Lys	Gln	His	Ser	Ala	Ile	Leu	Ala	Ala	Pro
	50					55					60				
Asn	Pro	Asp	Glu	Lys	Thr	Lys	Gln	Glu	Leu	Glu	Asp	Leu	Thr	Ala	Asp
	65				70				75						80
Ile	Lys	Lys	Thr	Ala	Asn	Lys	Val	Arg	Ser	Lys	Leu	Lys	Ala	Ile	Glu
			85					90						95	
Gln	Ser	Ile	Glu	Gln	Glu	Glu	Gly	Leu	Asn	Arg	Ser	Ser	Ala	Asp	Leu
			100				105						110		
Arg	Ile	Arg	Lys	Thr	Gln	His	Ser	Thr	Leu	Ser	Arg	Lys	Phe	Val	Glu
		115					120					125			
Val	Met	Thr	Glu	Tyr	Asn	Ala	Thr	Gln	Ser	Lys	Tyr	Arg	Asp	Arg	Cys
	130					135					140				
Lys	Asp	Arg	Ile	Gln	Arg	Gln	Leu	Glu	Ile	Thr	Gly	Arg	Thr	Thr	Thr
	145				150					155					160
Asn	Glu	Glu	Leu	Glu	Asp	Met	Leu	Glu	Ser	Gly	Lys	Leu	Ala	Ile	Phe
			165					170						175	
Thr	Asp	Asp	Ile	Lys	Met	Asp	Ser	Gln	Met	Thr	Lys	Gln	Ala	Leu	Asn
		180						185					190		
Glu	Ile	Glu	Thr	Arg	His	Asn	Glu	Ile	Ile	Lys	Leu	Glu	Thr	Ser	Ile
		195					200					205			
Arg	Glu	Leu	His	Asp	Met	Phe	Val	Asp	Met	Ala	Met	Leu	Val	Glu	Ser
	210					215					220				
Gln	Gly	Glu	Met	Ile	Asp	Arg	Ile	Glu	Tyr	Asn	Val	Glu	His	Ser	Val
	225				230					235					240
Asp	Tyr	Val	Glu	Arg	Ala	Val	Ser	Asp	Thr	Lys	Lys	Ala	Val	Lys	Tyr
			245						250					255	
Gln	Ser	Lys	Ala	Arg	Arg	Lys	Lys	Ile	Met	Ile	Ile	Ile	Cys	Cys	Val

TOPBLAST" 05021950

```
<210> 24
<211> 291
<212> PRT
<213> Drosophila sp.
```

[illegible]

<211> 291

<213> Caer

Met	Thr	Lys	Asp	Arg	Leu	Ser	Ala	Leu	Lys	Ala	Ala	Gln	Ser	Glu	Asp
1				5					10					15	
Glu	Gln	Asp	Asp	Asp	Met	His	Met	Asp	Thr	Gly	Asn	Ala	Gln	Tyr	Met
			20					25					30		
Glu	Glu	Phe	Phe	Glu	Gln	Val	Glu	Glu	Ile	Arg	Gly	Ser	Val	Asp	Ile

```
<210> 26
<211> 288
<212> PRT
<213> Strongylocentrotus purpuratus
```

Met	Arg	Asp	Arg	Leu	Gly	Ser	Leu	Lys	Arg	Asn	Glu	Glu	Asp	Asp	Val
1				5					10					15	
Gly	Pro	Glu	Val	Ala	Val	Asn	Val	Glu	Ser	Glu	Lys	Phe	Met	Glu	Glu
			20					25					30		
Phe	Phe	Glu	Gln	Val	Glu	Glu	Val	Arg	Asn	Asn	Ile	Asp	Lys	Ile	Ser
		35					40					45			
Lys	Asn	Val	Asp	Glu	Val	Lys	Lys	Lys	His	Ser	Asp	Ile	Leu	Ser	Ala
	50					55					60				
Pro	Gln	Ala	Asp	Glu	Lys	Val	Lys	Asp	Glu	Leu	Glu	Glu	Leu	Met	Ser
65					70					75					80
Asp	Ile	Lys	Lys	Thr	Ala	Asn	Lys	Val	Arg	Ala	Lys	Leu	Lys	Met	Met
				85					90					95	

Glu	Gln	Ser	Ile	Glu	Gln	Glu	Glu	Ser	Ala	Lys	Met	Asn	Ser	Ala	Asp
			100					105					110		
Val	Arg	Ile	Arg	Lys	Thr	Gln	His	Ser	Thr	Leu	Ser	Arg	Lys	Phe	Val
		115					120					125			
Glu	Val	Met	Thr	Asp	Tyr	Asn	Ser	Thr	Gln	Thr	Asp	Tyr	Arg	Glu	Arg
	130					135					140				
Cys	Lys	Gly	Arg	Ile	Gln	Arg	Gln	Leu	Glu	Ile	Thr	Gly	Lys	Ser	Thr
145					150					155					160
Thr	Asp	Ala	Glu	Leu	Glu	Asp	Met	Leu	Glu	Ser	Gly	Asn	Pro	Ala	Ile
			165					170						175	
Phe	Thr	Ser	Gly	Ile	Ile	Met	Asp	Thr	Gln	Gln	Ala	Lys	Gln	Thr	Leu
		180					185						190		
Arg	Asp	Ile	Glu	Ala	Arg	His	Asn	Asp	Ile	Ile	Lys	Leu	Glu	Ser	Ser
	195						200					205			
Ile	Arg	Glu	Leu	His	Asp	Met	Phe	Met	Asp	Met	Ala	Met	Leu	Val	Glu
	210					215					220				
Ser	Gln	Gly	Glu	Met	Ile	Asp	Arg	Ile	Glu	Tyr	Asn	Val	Glu	Gln	Ser
225					230					235					240
Val	Asp	Tyr	Val	Glu	Thr	Ala	Lys	Met	Asp	Thr	Lys	Lys	Ala	Val	Lys
			245						250					255	
Tyr	Gln	Ser	Lys	Ala	Arg	Arg	Lys	Lys	Phe	Tyr	Ile	Ala	Ile	Cys	Cys
		260					265					270			
Gly	Val	Ala	Leu	Gly	Ile	Leu	Val	Leu	Val	Leu	Ile	Ile	Val	Leu	Ala
		275					280					285			

<210> 27
 <211> 13
 <212> PRT
 <213> Homo sapiens

<400> 27
 Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met
 1 5 10

<210> 28
 <211> 15
 <212> PRT
 <213> Homo sapiens

<400> 28
 Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys
 1 5 10 15

<210> 29
 <211> 16
 <212> PRT
 <213> Homo sapiens

<400> 29
 Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met

TEB28036024650

<400> 33
Gln Asn Arg Gln Ile Asp Arg Ile Met Glu Lys Ala Asp Ser Asn Lys
1 5 10 15
Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly Ser
20 25 30
Gly

<400> 34

```
<210> 35
<211> 32
<212> PRT
<213> Mus musculus
```

<400> 35

```
<210> 36
<211> 34
<212> PRT
<213> Gallus gallus
```

<400> 36

```
<210> 37
<211> 33
<212> PRT
<213> Carassius auratus
```

<400> 37

<210> 38

<211> 33
<212> PRT
<213> *Carassius auratus*

<400> 38
Gln Asn Arg Gln Ile Asp Arg Ile Met Glu Lys Ala Asp Ser Asn Lys
1 5 10 15
Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly Ser
20 25 30
Gly

<210> 39
<211> 30
<212> PRT
<213> *Torpedo sp.*

<400> 39
Gln Asn Ala Gln Val Asp Arg Ile Val Val Lys Gly Asp Met Asn Lys
1 5 10 15
Ala Arg Ile Asp Glu Ala Asn Lys His Ala Thr Lys Met Leu
20 25 30

<210> 40
<211> 33
<212> PRT
<213> *Strongylocentrotus purpuratus*

<400> 40
Gln Asn Ser Gln Val Gly Arg Ile Thr Ser Lys Ala Glu Ser Asn Glu
1 5 10 15
Gly Arg Ile Asn Ser Ala Asp Lys Arg Ala Lys Asn Ile Leu Arg Asn
20 25 30
Lys

<210> 41
<211> 31
<212> PRT
<213> *Caenorhabditis elegans*

<400> 41
Gln Asn Arg Gln Leu Asp Arg Ile His Asp Lys Gln Ser Asn Glu Val
1 5 10 15
Arg Val Glu Ser Ala Asn Lys Arg Ala Lys Asn Leu Ile Thr Lys
20 25 30

<210> 42
<211> 31

Truncated at 360

<212> PRT

<213> *Drosophila* sp.

<400> 42

Gln	Asn	Arg	Gln	Ile	Asp	Arg	Ile	Asn	Arg	Lys	Gly	Glu	Ser	Asn	Glu
1			5					10						15	
Ala	Arg	Ile	Ala	Val	Ala	Asn	Gln	Arg	Ala	His	Gln	Leu	Leu	Lys	
			20					25					30		

<210> 43

<211> 32

<212> PRT

<213> *Hirudinida* sp.

<400> 43

Gln	Asn	Arg	Gln	Val	Asp	Arg	Ile	Asn	Asn	Lys	Met	Thr	Ser	Asn	Gln
1			5					10						15	
Leu	Arg	Ile	Ser	Asp	Ala	Asn	Lys	Arg	Ala	Ser	Lys	Leu	Leu	Lys	Glu
			20					25					30		

<210> 44

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<400> 44

Ser	Asn	Lys	Thr	Arg	Ile	Asp	Glu	Ala	Asn	Gln	Arg	Ala	Thr	Lys	Ala
1			5					10						15	
Leu															

<210> 45

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<221> MOD_RES

<222> 16

<223> Xaa=Nle

<400> 45

Ser	Asn	Lys	Thr	Arg	Ile	Asp	Glu	Ala	Asn	Gln	Arg	Ala	Thr	Lys	Xaa
1			5					10						15	
Leu															

103230" 3602460

<210> 46
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<400> 46
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Ala Met
1 5 10 15
Leu

<210> 47
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<400> 47
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Ser Lys Met
1 5 10 15
Leu

<210> 48
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 14
<223> Xaa=Abu

<400> 48
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Xaa Lys Met
1 5 10 15
Leu

<210> 49

TO3230"85024660

<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 13
<223> Xaa=Abu

<400> 49
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Xaa Thr Lys Met
1 5 10 15
Leu

<210> 50
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<400> 50
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Ala Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 51
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 11
<223> Xaa=Abu

<400> 51
Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Xaa Ala Thr Lys Met Leu
1 5 10 15

<210> 52
<211> 17
<212> PRT

FOBEBD-BBCEH650

<213> Artificial Sequence

<220>

<223> synthetic peptide

<400> 52

Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Asn Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 53

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<400> 53

Ser Asn Lys Thr Arg Ile Asp Glu Ala Ala Gln Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 54

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<221> MOD_RES

<222> 9

<223> Xaa=Abu

<400> 54

Ser Asn Lys Thr Arg Ile Asp Glu Xaa Asn Gln Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 55

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

TO3230" B602460

<400> 55

Ser Asn Lys Thr Arg Ile Asp Gln Ala Asn Gln Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 56

<211> 17

<212> PRT

<213> Artificial Sequence

<220>

<223> synthetic peptide

<400> 56

Ser Asn Lys Thr Arg Ile Asn Glu Ala Asn Gln Arg Ala Thr Lys Met
1 5 10 15
Leu

<210> 57

<211> 40

<212> PRT

<213> Homo sapiens

<400> 57

Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp Asp Arg
1 5 10 15
Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Ser Ser Ala Ala
20 25 30
Lys Leu Lys Arg Lys Tyr Trp Trp
35 40

<210> 58

<211> 40

<212> PRT

<213> Bos taurus

<400> 58

Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Asp Asp Arg
1 5 10 15
Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Thr Ser Ala Ala
20 25 30
Lys Leu Lys Arg Lys Tyr Trp Trp
35 40

<210> 59

<211> 40

FOIEBO"BOETHBO

<213> Rattus sp.

Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp	Asp	Arg
1				5					10					15	
Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Val	Phe	Glu	Ser	Ser	Ala	Ala
			20					25					30		
Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp								
		35					40								

<211> 40

<213> Rattus sp.

Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp	Asp	Arg
1				5					10					15	
Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Gln	Phe	Glu	Thr	Ser	Ala	Ala
			20					25					30		
Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp								
		35					40								

<211> 40

<213> Rattus sp.

Asp	Lys	Val	Leu	Glu	Arg	Asp	Gln	Lys	Leu	Ser	Glu	Leu	Asp	Asp	Arg
1				5					10					15	
Ala	Asp	Ala	Leu	Gln	Ala	Gly	Ala	Ser	Gln	Phe	Glu	Thr	Ser	Ala	Ala
			20					25					30		
Lys	Leu	Lys	Arg	Lys	Tyr	Trp	Trp								
		35					40								

<211> 40

<213> Rattus sp.

Asp	Leu	Val	Ala	Gln	Arg	Gly	Glu	Arg	Leu	Glu	Leu	Leu	Ile	Asp	Lys
1				5					10					15	
Thr	Glu	Asn	Leu	Val	Asp	Ser	Ser	Val	Thr	Phe	Lys	Thr	Thr	Ser	Arg
			20					25					30		
Asn	Leu	Ala	Arg	Ala	Met	Cys	Met								
		35					40								

<400> 66
Asp Lys Val Leu Asp Arg Asp Gly Ala Leu Ser Val Leu Asp Asp Arg
1 5 10 15
Ala Asp Ala Leu Gln Gln Gly Ala Ser Gln Phe Glu Thr Asn Ala Gly
20 25 30
Lys Leu Lys Arg Lys Tyr Trp Trp
35 40

<400> 67

<210> 68

<400> 68

<210> 69

<400> 69

<210> 70

<400> 70

Glu Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu Leu Gly Glu Arg
1 5 10 15
Ala Asp Gln Leu Glu Gly Gly Ala Ser Gln Ser Glu Gln Gln Ala Gly
20 25 30
Lys Leu Lys Arg Lys Gln Trp Trp

40

<400> 71
Glu Lys Val Leu Glu Arg Asp Ser Lys Leu Ser Glu Leu Asp Asp Arg
1 5 10 15
Ala Asp Ala Leu Gln Gln Gly Ala Ser Gln Phe Glu Gln Gln Ala Gly
20 25 30
Lys Leu Lys Arg Lys Phe Trp Leu
35 40

```
<400> 72
Asp Lys Val Leu Glu Lys Asp Gln Lys Leu Ala Glu Leu Asp Arg Ala
 1             5             10             15
Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu Ala Ser Ala Gly Lys
          20             25             30
Leu Lys Arg Lys Phe Trp Trp
      35
```

```
<400> 73
Glu Arg Ala Val Ser Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
 1             5             10             15
Ala Arg
```

```
<400> 74
Glu Arg Ala Val Ser Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
 1             5             10             15
Ala Arg
```

```
<400> 75
Glu His Ala Lys Glu Glu Thr Lys Lys Ala Ile Lys Tyr Gln Ser Lys
 1             5             10             15
Ala Arg
```

```
<400> 76
Glu Lys Ala Arg Asp Glu Thr Arg Lys Ala Met Lys Tyr Gln Gly Gly
 1             5             10             15
Ala Arg
```

```
<400> 77
Glu Arg Gly Gln Glu His Val Lys Ile Ala Leu Glu Asn Gln Lys Lys
 1             5             10             15
Ala Arg
```

```
<400> 78
Val  Pro  Glu  Val  Phe  Val  Thr  Lys  Ser  Ala  Val  Met  Tyr  Gln  Cys  Lys
  1              5              10              15
Ser  Arg
```

```
<210> 79
<211> 18
<212> PRT
```

<213> Strongylocentrotus purpuratus

<400> 79

Val Arg Arg Gln Asn Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 80

<211> 18

<212> PRT

<213> Aplysia sp.

<400> 80

Glu Thr Ala Lys Met Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 81

<211> 18

<212> PRT

<213> Teuthoida sp.

<400> 81

Glu Thr Ala Lys Val Asp Thr Lys Lys Ala Val Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 82

<211> 18

<212> PRT

<213> Drosophila sp.

<400> 82

Gln Thr Ala Thr Gln Asp Thr Lys Lys Ala Leu Lys Tyr Gln Ser Lys
1 5 10 15
Ala Arg

<210> 83

<211> 18

<212> PRT

<213> Hirudinida sp.

<400> 83

Glu Thr Ala Ala Ala Asp Thr Lys Lys Ala Met Lys Tyr Gln Ser Ala
1 5 10 15

TE09230"66024660

Ala Arg

<210> 84
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<400> 84
Gly Gly Gly Gly Ser
1 5

<210> 85
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine

<221> MOD_RES
<222> 20
<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 85
Xaa Asp Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys
1 5 10 15
Met Leu Xaa

<210> 86
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<221> MOD_RES

T03230"3502450

```

<222> 1
<223> Xaa=fluorescein-modified lysine

<400> 86
Xaa Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln
 1             5             10

<210> 87
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic construct

<221> MOD_RES
<222> 7
<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 87
Arg Ala Thr Lys Met Leu Xaa
 1             5

<210> 88
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine

<221> MOD_RES
<222> 23
<223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 88
Xaa Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr
 1             5             10             15
Lys Met Leu Gly Ser Gly Xaa

```

```
<210> 89
<211> 21
<212> PRT
<213> Artificial Sequence
```

```
<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine
```

```
<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal
```

```
<210> 90
<211> 24
<212> PRT
<213> Artificial Sequence
```

```
<221> MOD_RES
<222> 1
<223> Xaa=fluorescein-modified lysine
```

```
<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal
```

<400> 90
Xaa Ala Asp Ser Asn Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala
1 5 10 15

<210> 93
 <211> 22
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthetic peptide

<221> MOD_RES
 <222> 1
 <223> Xaa=fluorescein-modified lysine

<221> MOD_RES
 <222> 22
 <223> Xaa=tetramethylrhodamine-modified lysine

<221> AMIDATION
 <222> (0)...(0)
 <223> at the C-terminal

<400> 93
 Xaa Met Glu Lys Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys
 1 5 10 15
 Met Leu Gly Ser Gly Xaa
 20

<210> 94
 <211> 16
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthetic peptide

<221> MOD_RES
 <222> 1
 <223> Xaa-DABCYL modified lysine

<221> MOD_RES
 <222> 16
 <223> Xaa=EDANS modified glutamate

<221> AMIDATION
 <222> (0)...(0)
 <223> at the C-terminal

<400> 94
 Xaa Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Xaa

bioRxiv preprint doi: <https://doi.org/10.1101/201604>; this version posted April 1, 2016. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

```

1              5              10              15

<210> 95
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> synthetic peptide

<221> MOD_RES
<222> 1
<223> Xaa=DABCYL modified lysine

<221> MOD_RES
<222> 19
<223> Xaa=EDANS modified lysine

<221> AMIDATION
<222> (0)...(0)
<223> at the C-terminal

<400> 95
Xaa Thr Arg Ile Asp Glu Ala Asn Gln Arg Ala Thr Lys Met Leu Gly
 1              5              10              15
Ser Gly Xaa

<210> 96
<211> 118
<212> PRT
<213> Homo sapiens

<400> 96
Met Ser Ala Pro Ala Gln Pro Pro Ala Glu Gly Thr Glu Gly Thr Ala
 1              5              10              15
Pro Gly Gly Gly Pro Pro Gly Pro Pro Pro Asn Met Thr Ser Asn Arg
              20              25              30
Arg Leu Gln Gln Thr Gln Ala Gln Val Glu Glu Val Val Asp Ile Ile
              35              40              45
Arg Val Asn Val Asp Lys Val Leu Glu Arg Asp Gln Lys Leu Ser Glu
              50              55              60
Leu Asp Asp Arg Ala Asp Ala Leu Gln Ala Gly Ala Ser Gln Phe Glu
65              70              75              80
Ser Ser Ala Ala Lys Leu Lys Arg Lys Tyr Trp Trp Lys Asn Cys Lys
              85              90              95
Met Met Ile Met Leu Gly Ala Ile Cys Ala Ile Ile Val Val Val Ile
              100              105              110
Val Ile Tyr Phe Phe Thr
              115

```